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Rupture Rates of Small Abdominal Aortic Aneurysms: A Systematic Review of the Literature

Powell J.T., Gotensparre S.M., Sweeting M.J., Brown L.C., Fowkes F.G.R., Thompson S.G. Eur J Vasc Endovasc Surg 2011;41:2-10.

Background: Small aneurysms of the abdominal aorta (3.0–5.5 cm in diameter) often are managed by regular surveillance, rather than surgery, because the risk of surgery is considered to outweigh the risk of aneurysm rupture. The risk of small aneurysm rupture is considered to be low. The purpose of this review is to summarise the reported estimates of small aneurysm rupture rates.

Methods and findings: We conducted a systematic review of the literature published before 2010 and identified 54 potentially eligible reports. Detailed review of these studies showed that both ascertainment of rupture, patient follow-up and causes of death were poorly reported: diagnostic criteria for rupture were never reported. There were only 14 studies from which rupture rates (as ruptures per 100 person-years) were available. These 14 published studies included 9779 patients (89% male) over the time period 1976–2006 but only 7 of these studies provided rupture rates specifically for the diameter range 3.0–5.5 cm, which ranged from 0 to 1.61 ruptures per 100 person-years.

Conclusions: Rupture rates of small abdominal aortic aneurysms would appear to be low, but most studies have been poorly reported and did not have clear ascertainment and diagnostic criteria for aneurysm rupture.

Comparison of Surveillance Versus Aortic Endografting for Small Aneurysm Repair (CAESAR): Results from a Randomised Trial

Cao P., De Rango P., Verzini F., Parlani G., Romano L., Cieri E., for the CAESAR Trial Group. Eur J Vasc Endovasc Surg 2011;41:13-25.

Background: Randomised trials have failed to demonstrate benefit from early surgical repair of small abdominal aortic aneurysm (AAA) compared with surveillance. This study aimed to compare results after endovascular aortic aneurysm repair (EVAR) or surveillance in AAA <5.5 cm.

Methods: Patients (50–79 years) with AAA of 4.1–5.4 cm were randomly assigned, in a 1:1 ratio, to receive immediate EVAR or surveillance by ultrasound and computed tomography (CT) and repair only after a defined threshold (diameter ≥5.5 cm, enlargement >1 cm /year, symptoms) was achieved. The main end point was all-cause mortality. Recruitment is closed; results at a median follow-up of 32.4 months are here reported.

Results: Between 2004 and 2008, 360 patients (early EVAR = 182; surveillance = 178) were enrolled. One perioperative death after EVAR and two late ruptures (both in the surveillance group) occurred. At 54 months, there was no significant difference in the main end-point rate [hazard ratio (HR) 0.76; 95% confidence interval (CI) 0.30–1.93; $p = 0.6$] with Kaplan–Meier estimates of all-cause mortality of 14.5% in the EVAR and 10.1% in the surveillance group. Aneurysm-related mortality, aneurysm rupture and major morbidity rates were similar. Kaplan–Meier estimates of aneurysms growth ≥5 mm at 36 months were 8.4% in the EVAR group and 67.5% in the surveillance group (HR 10.49; 95% CI 6.88–15.96; $p < 0.01$). For aneurysms under surveillance, the probability of delayed repair was 59.7% at 36 months (84.5% at 54 months). The probability of receiving open repair at 36 months for EVAR feasibility loss was 16.4%.

Conclusion: Mortality and rupture rates in AAA <5.5 cm are low and no clear advantage was shown between early or delayed EVAR strategy. However, within 36 months, three out of every five small aneurysms under surveillance might grow to require repair and one out of every six might lose feasibility for EVAR.

Surveillance is safe for small AAA if close supervision is applied. Long-term data are needed to confirm these results.

Clinical Trial Registration Information: This study is registered, NCT Identifier: NCT00118573.

A Randomised Placebo-controlled Double-blind Trial to Evaluate Lipid-lowering Pharmacotherapy on Proteolysis and Inflammation in Abdominal Aortic Aneurysms

Dawson J.A., Choke E., Loftus I.M., Cockerill G.W., Thompson M.M. Eur J Vasc Endovasc Surg 2011;41:28-35.

Objectives: Modulation of abdominal aortic aneurysm (AAA) expansion by HMG-CoA reductase inhibitors (statins) might be linked to reducing IL-6 and MMP-9, which may be consequent on reducing plasma cholesterol. Ezetimibe is a novel cholesterol absorption inhibitor used in combination with statins. This pilot study compared the biological effects of ezetimibe combination therapy with simvastatin alone on parameters relevant to aneurysm expansion including cytokines and proteolytic enzymes.

Design: Randomised placebo-controlled double-blind trial.

Materials & Methods: Eighteen patients scheduled for elective open AAA repair were randomised to simvastatin 40 mg plus ezetimibe 10 mg ($n = 9$), or simvastatin 40 mg plus placebo ($n = 9$), for 32.5 days (IQR 28–50.5) until the day of surgery. Total concentrations of TNF-α, IL-1β, IL-6, IL-8, IL-10, MMPs-1, -2, -3, -8, -9, -12, -13, TIMP-1 and -2 were measured in plasma, aortic wall homogenates and tissue culture explants.

Results: Two patients in the placebo arm did not undergo open repair precluding aortic samples. Ezetimibe was associated with a significant reduction in aortic wall MMP-9 ($p = 0.02$) and aortic wall IL-6 ($p = 0.02$), associated with a reduction in plasma lipids.

Conclusions: These results suggest that ezetimibe combination therapy reduces aortic wall proteolysis and inflammation, key processes that drive AAA expansion. A larger RCT is justified focussing on aneurysm growth rates in small AAA.

Endovascular Treatment of Ruptured Thoracic Aortic Aneurysm in Patients Older than 75 Years

Jonker F.H.W., Verhagen H.J.M., Heijmen R.H., Lin P.H., Trimarchi S., Lee W.A., Moll F.L., Athamneh H., Muhs B.E. Eur J Vasc Endovasc Surg 2011;41:48-53.

Objectives: To investigate the outcomes of thoracic endovascular aortic repair (TEVAR) for ruptured descending thoracic aortic aneurysm (rDTAA) in patients older than 75 years.

Methods: we retrospectively identified all patients treated with TEVAR for rDTAA at seven referral centres between 2002 and 2009. The cohort was stratified according to age ≤75 and >75 years, and the outcomes after TEVAR were compared between both groups.

Results: Ninety-two patients were identified of which 73% ($n = 67$) were ≤75 years, and 27% ($n = 25$) were older than 75 years. The 30-day mortality was 32.0% in patients older than 75 years, and 13.4% in the remaining patients ($p = 0.041$). Patients older than 75 years suffered more frequently from postoperative stroke (24.0% vs. 1.5%, $p = 0.001$) and pulmonary complications (40.0% vs. 9.0%, $p = 0.001$). The aneurysm-related survival after 2 years was 52.1% for patients >75 years, and 83.9% for patients ≤75 years ($p = 0.006$).

Conclusions: Endovascular treatment of rDTAA in patients older than 75 years is associated with an inferior outcome compared with patients younger than 75 years. However, the mortality and morbidity rates in patients above 75 years are still acceptable. These results may indicate that endovascular treatment for patients older than 75 years with rDTAA is worthwhile.

In Situ Revascularisation with Silver-coated Polyester Prostheses and Arterial Homografts in Patients with Aortic Graft Infection – A Prospective, Comparative, Single-centre Study

Pupka A., Skora J., Janczak D., Plonek T., Marczak J., Szydełko T. Eur J Vasc Endovasc Surg 2011;41:61-7.

Objective: The aim of our study was to evaluate the effectiveness of *in situ* revascularisation with the use of arterial homografts and silver-coated prostheses in the treatment of aortic graft infection.

Materials: A total of 77 consecutive patients (74 males, three females, mean age: 58years), hospitalised between 2001 and 2008, were enrolled into the study. Patients were assigned to three groups: group 1 ($n = 24$) – fresh arterial homograft with subsequent immunosuppression, group 2 ($n = 26$) – fresh arterial homograft without immunosuppression and group 3 ($n = 27$) – silver-coated prosthesis.

Methods: The course of infection was assessed by scintigraphy with ^{99m}Technetium-labelled leucocytes, Duplex–Doppler ultrasound, angio-computed tomography (CT) and microbiological examination.

Results: The mean follow-up was 22.8 (±10.1) months. There was a significant decrease in leucocyte accumulation around the graft among all groups (group 1: $p = 0.012$, group 2: $p = 0.006$ and group 3: $p = 0.021$). The postoperative mortality rate in groups 1,2 and 3 was 8%, 23% and 11%, respectively. The postoperative morbidity was 35% in group 2, 16% in group1 and 7% in group 3.